

NOTES

Foraging Behaviour of Spoon-billed Sandpipers *Eurynorhynchus pygmeus* on a Mudflat in Peninsular Thailand

Within the framework of the INTERWADER program for South-East Asia, feeding ecology of waders at a number of places along the coasts of the Malay Peninsula was studied in the autumn of 1984. During the study we observed Spoon-billed Sandpipers *Eurynorhynchus pygmeus* in the southern part of the Gulf of Thailand on an intertidal mudflat in Pattani Bay ($6^{\circ} 35' N$; $101^{\circ} 16' E$).

The discovery of such a rare bird, this being the second record for Thailand (PARISH, 1985) along with the large density and great diversity of other wader species found here, indicates that this area forms one of the few important migratory wader stop-over sites in Thailand.

The mudflat consisted of silt without any coarser particles. During low tide three zones merging into another could be distinguished in the bare flat between the salt marsh vegetation and the water's edge. The upper zone, flooded during spring tides only, was dried out and cracked at the surface. In this zone, foraging Little Ringed Plovers *Charadrius dubius*, Common Sandpipers *Actitis hypoleucus* and Long-toed Stints *Calidris subminuta* were observed. The lowest zone, flooded during all high tides, consisted of fine colloidal silt and was almost inaccessible to man because of the deep mud. This zone served as a feeding area for Marsh Sandpipers *Tringa stagnatilis*, Redshanks *Tringa totanus* and Broad-billed Sandpipers *Limicola falcinellus*. The intermediate zone, immersed during median and spring high tides, consisted of rather consolidated mud with a wet, sticky surface. Human waders sank in 20–30 cm. In this zone on 15–17th October 1984 we observed 13 foraging Spoon-billed Sandpipers in a larger flock of Red-necked Stints *Calidris ruficollis*. Despite searching intensively for the species in most other parts of the mudflat, we observed it exclusively in this locality. The spatulate bill was diagnostic, but it was not the most conspicuous field character. From a distance Spoon-billed Sandpipers closely resembled more numerous Red-necked Stints; however, there was a clear contrast between the darker wings and grey mantle of the Spoon-billed Sandpipers. This, along with the strikingly different feeding behaviour, made them obvious in the mixed flock.

For 3 days we observed the birds with a 40×60 telescope from a distance of 20 to 40 m for about half an hour during low tide and made notes on their behaviour. In addition, protocols were made of foraging behaviour of individual birds for a total period of 24 min.

Most of the time the birds had their heads lowered while the slightly opened bill touched the mud. The head vibrated regularly with a drill-like action, but the bill was never seen to go down into the mud deeper than the spatula. The drilling movements were usually made forwards, but also sideways. Mud that stuck to the bill tip was removed by a rapid, sideward movement of the head. The bill was also often

cleaned by scraping the tip with a foot and washing it in a small puddle. Swallowing movements were never conspicuous and food items were so small they could not be identified. The Spoon-billed Sandpipers ignored the small crabs and flies visible on the mud and probably only hunted by taste and/or touch. While foraging, Spoon-billed Sandpipers made on average 63.5 steps/minute. They rapidly passed small depressions with softer mud or with water, whilst making a few pecking movements, to start drilling again in the relatively drier mud in more elevated parts. By turning around and intensively hunting in small areas some birds stayed for 10 to 15 minutes within a single square meter. This behaviour differed from that of the Red-necked Stints foraging in the same area. The stints walked about as much as the Spoon-billed Sandpipers (68.3 versus 63.5 steps/minute), but more or less in a straight line. They did not turn around frequently and progressed about 1 meter/minute. Most of the stints made up-and-down movements with the bill (as the needle of a sewing machine) moving it from side to side while walking slowly, but sometimes also drilled in one place. Now and then they rapidly walked 5 to 20 paces and started "sewing" again for 10 to 30 seconds. Their prey was small, not visible through the telescope and perhaps the same as that of the Spoon-billed Sandpiper. On the softer mud, closer to the lower zone, some Red-necked Stints hunted by eye. These birds walked faster, making on average 87.4 steps/minute and made only discrete pecks by which they caught 2.0 ± 0.8 red polychaetes/minute (probably *Dendronereis* sp.).

We studied the macrobenthic fauna (using a 1 mm sieve) living in the mud and found a biomass value of 29 to 33 g ash-free dry weight (ADW)/m². This is higher than found at other sites in the Malay Peninsula (SWENNEN & MARTEIJN, 1985). The most numerous species was a polychaete worm *Dendronereis* sp., which occurred in densities of 3000 to 4000 individuals/m² (representing 15 to 18 g ADW). These polychaetes were easily recognizable as prey of other wader species, even when foraging was observed over a greater distance and they were certainly not being eaten by the Spoon-billed Sandpipers. Other macrobenthic species found were even larger than the polychaetes and therefore the prey of the Spoon-billed Sandpiper was presumed to belong to the meiofauna (i.e. animals passing a 1 mm sieve). We could not sample the meiofauna this time but during a second visit in 1985 the meiofauna and macrofauna were sampled at the same site. Macrofaunal composition and biomass values corresponded to those found in 1984 and meiofauna values were found to be < 1 g ADW/m² (SWENNEN & WITTE, 1986). However, in 1985 some invertebrates were found which may not have been detected in the 1984 macrobenthos samples, due to their small size and fragility. These were megalopods, other crustacean larvae, juvenile polychaetes and juvenile molluscs. In none of the 1985 meiobenthos samples did the biomass of these animals exceed 0.4 g ADW/m², and in such low concentrations they were thought to be unprofitable for birds. Reproduction within most macrofaunal species is usually synchronized, so there is a possibility that the Spoon-billed Sandpipers observed in 1984 were attracted by a

temporary hyper-abundance of prey caused by a heavy spat-fall of molluscs or other macrobenthic animals.

The Spoon-billed Sandpipers were feeding in a loose flock, which remained rather sedentary for a long time. The birds were feeding 0.1 to a few m apart and showed no signs of interference even though the bills of two birds sometimes nearly touched when drilling in the mud. Interactions between Spoon-billed Sandpipers and Red-necked Stints were not observed either. However, the birds stopped foraging for a while and crouched close to the ground when a Brahminy Kite *Haliastur indus* flew over, which happened frequently. A few times all birds flew up in panic. Mostly, the Spoon-billed Sandpipers and the Red-necked Stints separated in the air and formed more or less distinguishable flocks before they landed again after a short time.

The breeding grounds of the Spoon-billed Sandpipers are restricted to the extreme North-Eastern part of Siberia (PORTENKO, 1957). Records of birds in their wintering grounds are scattered and few, ranging from the coastal areas of Southern India, Tenasserim, Malay Peninsula, Thailand and Southern China (BENT. 1927).

Very few feeding observations of Spoon-billed Sandpipers have been made. In the breeding area birds have been observed mainly pecking insects from shallow water or snapping flying ones from the air (PORTENKO, 1957). In non-breeding areas, other methods of feeding have also been observed. In December 1983 three birds were seen feeding "in a Spoonbill-like manner" in a saltwater lagoon with a fine, loose silt bottom near Point Calimere, south India. Another bird was seen with Sanderlings *Calidris alba*, running up and down the beach following the waves, meanwhile feeding like a "vacuum cleaner" sweeping its bill from side to side as it ran forwards (DAVID S. MELVILLE *in litt.*). On an intertidal sandflat in S. Korea, PIERSMA (1986) described that the birds hold their bills down almost vertically during foraging. On dry places they walked fast, straight on and pecked sideways. During some pecks they made short vibrations with the tip of the spatula in the sediment. In water 1–2 cm deep they walked more slowly while swishing the bill from side to side with the spatula in the water. This was alternated with short series of discrete pecks. MCWHIRTER (1987) observed a Spoon-billed Sandpiper in Okinawa that foraged by trampling with its feet, whereafter it stepped backwards and jabbed its bill several times into the riled area. The behaviour was considered similar neither to the trampling behaviour of the Little Ringed Plover *Charadrius dubius* nor that of the Black-headed Gull *Larus ridibundus*. At Point Calimere, SUGATHAN (1985) found three kinds of feeding methods: (1) long continuous scoops while walking; (2) semi-circular side to side scoops standing at one place, followed by a few steps and repeating the same procedure and (3) pecking food particles or insects from dry hard soil or catching them at ground level or from up to about 10 cm in the air. The same author studied two stomachs which contained fragments of insects (small beetles and Diptera), unidentified particles and some grains of sand.

These observations, together with the drilling method described above, may indicate that Spoon-billed Sandpipers can adapt their feeding behaviour to local

circumstances and that we do not yet know the typical feeding habitat or the food. Thus, the specific advantage of the unique spatulate bill tip still remains obscure for the moment.

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